

Lesson 7.1 Exercises: Why Regulation Exists — AML, KYC, and Financial Crime

Module 7: The Compliance Problem

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Digital Finance — BSc Course

Exercise 1: Risk-Based Customer Classification

Scenario: You are a compliance analyst at a European bank. Classify each of the following customers as **Low**, **Medium**, or **High** risk and specify whether SDD, CDD, or EDD is required.

#	Customer	Key Characteristics
1	German pension fund	Regulated entity, domestic, transparent ownership
2	Cash-intensive restaurant chain	15 locations, family-owned, significant daily cash deposits
3	Shell company in the BVI	Nominee directors, ultimate owner is a PEP from a grey-listed country
4	UK university	Public institution, receives government funding
5	Crypto exchange (licensed)	Registered in Singapore, serves global clients, handles \$500M/month volume

Tasks:

- For each customer, identify the risk factors across all four dimensions (customer, geographic, product/service, channel).
- Assign a risk level (Low/Medium/High) and the corresponding due diligence level (SDD/CDD/EDD).
- For Customer 3, list the specific EDD steps you would take before accepting the relationship.

Difficulty: Introductory–Intermediate — tests application of the risk-based approach.

Exercise 2: Structuring Detection

Scenario: A bank customer's cash deposit history for the past 10 business days is as follows (synthetic data, amounts in USD):

Day	Branch	Amount
Day 1	Main St.	\$9,800
Day 2	Oak Ave.	\$9,600
Day 3	Main St.	\$9,900
Day 4	(no deposit)	—
Day 5	Park Rd.	\$9,700
Day 6	Oak Ave.	\$9,500
Day 7	Main St.	\$9,850
Day 8	Park Rd.	\$9,400
Day 9	Main St.	\$9,750
Day 10	Oak Ave.	\$9,600

Tasks:

- Calculate the total cash deposited over the 10-day period.
- How many Currency Transaction Reports (CTRs) would have been triggered? (Threshold: \$10,000.)
- What structuring red flags can you identify? List at least three specific indicators.
- Draft a one-paragraph SAR narrative describing the suspicious activity.

Difficulty: Intermediate — requires pattern recognition and narrative writing.

Exercise 3: Beneficial Ownership Tracing

Scenario: You must determine the beneficial owners of **Target Corp** (the customer). The ownership structure is:

- **Person A** owns 60% of **Holding X**
- **Person B** owns 40% of **Holding X**
- **Holding X** owns 50% of **Target Corp**
- **Person C** owns 100% of **Shell Y** (incorporated in the Cayman Islands)
- **Shell Y** owns 30% of **Target Corp**
- **Public shareholders** (widely held, no individual >5%) own 20% of **Target Corp**

Tasks:

- Calculate Person A's indirect ownership of Target Corp.
- Calculate Person B's indirect ownership of Target Corp.
- Calculate Person C's indirect ownership of Target Corp.
- Using a 25% beneficial ownership threshold, who qualifies as a beneficial owner?
- Person B is a PEP. Does this change the due diligence level even though B's ownership is below 25%? Explain.

Difficulty: Intermediate — requires multi-step ownership calculation.

Exercise 4: SAR Pipeline Economics

Scenario: A mid-sized bank's AML transaction monitoring system has the following annual metrics (synthetic data):

Metric	Value
Total transactions monitored	50,000,000
Alerts generated	180,000
Alerts escalated to Level-2 investigation	18,000
SARs filed	3,600
SARs that led to law enforcement action	72
Average analyst cost per Level-1 alert review	\$25
Average analyst cost per Level-2 investigation	\$150
Average cost per SAR filing	\$500
Annual technology cost (monitoring + screening)	\$8,000,000

Tasks:

- Calculate the false positive rate at the alert level (Level-1 to Level-2 escalation).
- Calculate the total annual cost of the AML program (technology + analyst costs + SAR filing).
- Calculate the cost per SAR filed and cost per law enforcement action.
- If a new AI system could reduce false positives by 50% while maintaining the same SAR filing rate, what would the annual savings be?

Difficulty: Intermediate–Advanced — requires cost analysis and computation.

Exercise 5: Sanctions Screening Challenge

Scenario: Your bank receives the following wire transfer instruction:

Field	Value
Sender	Petrochemical Trading LLC, Dubai, UAE
Sender's bank	First Gulf Bank, Abu Dhabi
Amount	\$2,400,000
Beneficiary	Industrial Supplies GmbH, Hamburg, Germany
Purpose	"Payment for industrial equipment — Invoice 2024-3847"
Intermediary bank	Deutsche Bank AG, Frankfurt

Your screening system flags two potential hits:

- 1 The sender's name partially matches a sanctioned entity: "Petrochemical Trading Co." (sanctioned under EU Russia sanctions)
- 2 The sender's jurisdiction (UAE) is not sanctioned but is a known transshipment hub

Tasks:

- a What additional information would you request to resolve the potential name match?
- b If the match is confirmed as a **true hit**, what must the bank do immediately?
- c If the match is a **false positive**, what documentation must the bank retain?
- d How does the UAE's status as a transshipment hub affect your risk assessment even if the sanctions hit is cleared?

Difficulty: Advanced — requires sanctions compliance reasoning.

Exercise 6: De-Risking Impact Assessment

Scenario: A major US bank decides to terminate all correspondent banking relationships with banks in the Pacific Island nations due to AML risk concerns. The affected countries rely on remittances for 20–40% of GDP.

Data (synthetic):

- Annual remittance volume to the region: \$2.5 billion
- Number of correspondent relationships terminated: 45
- Alternative formal channels available after de-risking: 8 (at 3x the cost)
- Estimated shift to informal channels (hawala, cash couriers): 30% of volume

Tasks:

- Calculate the additional cost burden on remittance senders if 70% of the volume shifts to the remaining formal channels at 3x the previous cost (assume previous average cost was 7% of remittance value).
- Estimate the dollar volume now flowing through unmonitored informal channels.
- Argue both sides: Is de-risking a **rational compliance decision** by the bank, or is it a **failure of the AML framework**?
- Propose two policy interventions that could reduce de-risking while maintaining AML integrity.

Difficulty: Advanced — requires economic analysis and policy reasoning.

Exercise 7: Designing an AML Program for a Neobank

Scenario: A new digital-only bank (neobank) is launching in Germany. It will offer current accounts, debit cards, and instant EUR transfers. All onboarding is digital (video-KYC or eID). The bank expects 500,000 customers within two years.

Tasks:

- a Design the key components of the neobank's AML program. For each of the 9 AML program components discussed in class, specify how a digital-only bank would implement it differently from a traditional bank.
- b The neobank wants to offer accounts to customers in 15 EU countries. What additional AML challenges does cross-border operation create?
- c Propose a transaction monitoring strategy that balances detection effectiveness with the false positive problem. What thresholds and rules would you set for the first year?
- d The neobank's CEO asks: "Can we use AI to replace human compliance analysts entirely?" Draft a 3-sentence response explaining why this is or is not feasible under current regulations.

Difficulty: Advanced–Integrative — requires synthesis of all lesson concepts.

Exercise 8: The AML Effectiveness Debate

Scenario: You are presenting to the board of a large European bank. The board has asked for an honest assessment of whether the bank's €120 million annual AML investment is "worth it."

Data (synthetic):

- AML program cost: €120M/year
- SARs filed: 8,200/year
- SARs leading to asset freezing or prosecution: 164 (2%)
- Estimated criminal funds passing through the bank undetected: €500M–€2B/year
- Last regulatory fine (5 years ago): €45M
- Industry average cost of a major AML fine: €500M–€2B

Tasks:

- Calculate the "cost per successful law enforcement outcome" ($€120M / 164$).
- Present the **business case** for maintaining the current investment level (consider fines, license risk, reputation).
- Present the **reform case** — what specific changes could make the €120M more effective?
- Take a position: Is the current AML system a necessary cost of operating in the financial system, or is it an example of "compliance theater"? Support your argument with data from the exercise.

Difficulty: Advanced–Integrative — requires critical analysis, financial reasoning, and argumentation.

Exercise 2:

- (a) Total = $9,800 + 9,600 + 9,900 + 9,700 + 9,500 + 9,850 + 9,400 + 9,750 + 9,600 = \mathbf{\$87,100}$ over 9 deposit days.
- (b) **Zero CTRs** — every deposit is below the **\\$10,000** threshold. This is precisely the point of structuring.
- (c) Red flags: (1) All deposits consistently below **\\$10,000** (just-below-threshold pattern); (2) deposits made at multiple branches (branch hopping); (3) high frequency (nearly daily); (4) amounts cluster in a narrow range (**\\$9,400–\\$9,900**), suggesting intentional calibration.
- (d) Example narrative: "Between [dates], the customer made 9 cash deposits totaling **\\$87,100** at three different branches. All deposits ranged from **\\$9,400 to \\$9,900** — consistently below the **\\$10,000** CTR threshold. The pattern of multi-branch, near-daily, just-below-threshold deposits is consistent with structuring to evade CTR requirements."

Exercise 3:

- (a) Person A: $60\% \times 50\% = \mathbf{30\%}$ of Target Corp.
- (b) Person B: $40\% \times 50\% = \mathbf{20\%}$ of Target Corp.
- (c) Person C: $100\% \times 30\% = \mathbf{30\%}$ of Target Corp.
- (d) Beneficial owners ($\geq 25\%$): **Person A (30%)** and **Person C (30%)**. Person B (20%) is below the threshold.
- (e) Yes — Person B's PEP status triggers EDD regardless of the ownership percentage. Regulations require identification and scrutiny of PEPs even below the ownership threshold if they exercise influence. The institution should investigate B's role in Holding X and Target Corp.

Answer Key (continued)

Exercise 4:

- (a) False positive rate at Level-1: $(180,000 - 18,000) / 180,000 = 162,000 / 180,000 = 90\%$.
- (b) Total cost: Technology **\$8M** + Level-1 reviews $(180,000 \times \$25 = \$4.5M)$ + Level-2 investigations $(18,000 \times \$150 = \$2.7M)$ + SAR filings $(3,600 \times \$500 = \$1.8M) =$ **\$17.0M/year**.
- (c) Cost per SAR: $\$17M / 3,600 = \$4,722$. Cost per law enforcement action: $\$17M / 72 = \$236,111$.
- (d) 50% fewer false positives at Level-1: New alerts = 90,000 false positives + 18,000 true escalations = 108,000. Level-1 savings: $(180,000 - 108,000) \times \$25 = \$1.8M/\text{year}$. Level-2 and SAR costs remain the same. Total savings = **\$1.8M**.

Exercise 6:

- (a) 70% of **\$2.5B** = **\$1.75B** through formal channels. Previous cost: $\$1.75B \times 7\% = \$122.5M$. New cost: $\$1.75B \times 21\% (3\times) = \$367.5M$. Additional burden: **\$245M/year**.
- (b) 30% of **\$2.5B** = **\$750M/year** through unmonitored channels.
- (c) Bank's perspective: Rational — the cost of maintaining correspondent relationships (compliance staff, regulatory risk, potential fines) exceeds the revenue from those relationships. Framework failure: De-risking pushes **\$750M** into unmonitored channels, making AML *harder* — the opposite of the framework's goal. It punishes legitimate users while sophisticated launderers find alternatives.
- (d) Possible interventions: (1) Create a "safe harbor" for banks maintaining correspondent relationships in high-risk regions if they demonstrate adequate controls; (2) establish a shared-cost compliance utility where multiple banks pool resources for monitoring high-risk corridors.

Exercise 8:

- (a) Cost per successful outcome: $\text{€}120\text{M} / 164 = \text{€}731,707$ per prosecution/freeze.
- (b) Business case: The €120M protects against (1) regulatory fines averaging €500M–€2B for major failures; (2) loss of banking license (existential risk); (3) reputational damage reducing customer trust; (4) personal criminal liability for executives and the MLRO. Expected cost of a single major enforcement action far exceeds several years of compliance spending.
- (c) Reform case: (1) Invest in AI/ML to reduce the 90% false positive rate, freeing analysts for complex cases; (2) participate in public-private data-sharing partnerships to detect cross-institutional patterns; (3) adopt network analytics instead of rules-based monitoring; (4) lobby for proportionate regulation that rewards effective compliance rather than punishing volume of SARs.
- (d) Both positions are defensible. The “necessary cost” argument rests on deterrence, regulatory compliance, and institutional protection. The “compliance theater” argument rests on the $< 1\%$ interception rate and the €731K cost per outcome. A strong answer acknowledges the tension: the system is both necessary (without it, the financial system is unmonitored) and inefficient (its detection rate is poor) — and the path forward is not abolition but modernization.